MULTICRITERIA OPTIMIZATION OF EVALUATION OF ECONOMIC EFFICIENCY OF INNOVATIVE PROJECTS

RESEARCH GROUP:

Ihor Kuksa
ORCID ID: 0000-0001-8486-2473
Doctor of Economics, Professor, First Vice-Rector
Kharkiv National Agrarian University named after V.V. Dokuchaiev

Olga Orlova-Kurilova
ORCID ID: 0000-0001-8382-8070
Candidate of Economics, Associate Professor,
Associate professor of the Management, Statistics and
Economic Analysis Department
Luhansk National Agrarian University

Ganna Bulkot
ORCID ID: 0000-0002-2657-2862
Candidate of Economics, Associate Professor,
Associate professor of the Audit Department
Kyiv National Economic University named after Vadym Hetman

Nadia Bugay
ORCID ID: 0000-0003-4670-935X
Candidate of Economics, Associate Professor,
Associate professor of the Audit Department
Kyiv National Economic University named after Vadym Hetman

Solod Oleksandr
ORCID ID: 0000-0003-2159-6045
Postgraduate Student of the Management Department
Poltava State Agrarian Academy

In the context of globalization and fierce competition in world markets, the high level of investment activity in the country is a key to economic and innovative development. The high level of wear and tear of fixed assets in developing countries gives special relevance to solving the problem of attracting investments for production development [1-3]. Hence, for the investment management system choosing an optimal variant among several available investment projects is one of the most responsible stages of ensuring the stable operation and sustainable development of an enterprise. The period of return on capital investments, options for its alternative use and the additionally generated income flow of the enterprise in the future period depend on how objectively and comprehensively the investment projects are evaluated [4-6]. In this regard, the development of optimal methods for evaluating the economic efficiency of investment projects becomes especially important [7-10]. The presence of certain shortcomings of modern methods of assessing the economic efficiency of investments significantly complicates the choice of the optimal version of an investment project. From the point of view of the solved problem context, applying the method of an ideal point is the most successful among the existing methods of multi-criteria optimization [10-14].

Thus, in general, the algorithm of comparative rating assessment of the economic efficiency of the investment project can be represented as a sequence of the following steps:
1. The source data is presented in the form of a matrix \( a_{ij} \), where the rows are recorded numbers of indicators \((i = 1, 2, 3 \ldots n)\), and the columns are the projects’ numbers \((j = 1, 2, 3 \ldots m)\).

2. For each indicator, the maximum value is found and entered in the column of the reference project \((m + 1)\).

3. Initial indicators of the matrix \( a_{ij} \) are standardized for the relevant indicator of the reference project by the formula (1):

\[
X_{ij} = \frac{a_{ij}}{\max a_{ij}},
\]

where \( X_{ij} \) - standardized indicators of economic efficiency of \( j \) project;
\( a_{ij} \) - initial indicators of the economic efficiency of the project.

4. For each analyzed project, the value of its rating \((R_j)\) is determined by the formula (2):

\[
R_j = \sqrt{K_1(1 - x_{1j}^2)^2 + \cdots + K_n(1 - x_{nj}^2)^2}
\]

where \( K_1, K_2, \ldots K_n \) - weights of the indicators assigned by the expert.

Thus, the evaluation of the project is carried out by comparing it for each indicator of economic efficiency with the reference project, which has the best results on all comparable parameters.

The advantages of the proposed rating technique include the absence of restrictions on the number of individual indicators of economic efficiency of the project and the fact that the investor determines their significance using weights. However, the final choice of the optimal investment project is left to the person who makes the appropriate decisions. Thereby, the proposed method of multi-criteria evaluation of investment efficiency allows improving the quality of management decisions during choosing investment projects and can be used by various companies at the stage of choosing the best investment option.

References:


